UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/582,427	06/08/2006	Xiaofeng Guo	42P22635	4846

8791   7590   08/18/2010
BLAKELY SOKOLOFF TAYLOR & ZAFMAN LLP
1279 OAKMEAD PARKWAY
SUNNYVALE, CA 94085-4040

EXAMINER
WEI, ZHENG

ART UNIT	PAPER NUMBER
2192	

MAIL DATE	DELIVERY MODE
08/18/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

	Application No.	Applicant(s)
Office Action Summary	10/582,427	GUO ET AL.
	Examiner	Art Unit
	ZHENG WEI	2192

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on *08 June 2006*.

2a) ☐ This action is **FINAL**.   2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) *1-28* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) *1-28* is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☒ The drawing(s) filed on *08 June 2006* is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a) ☒ All   b) ☐ Some *   c) ☐ None of:

      1. ☐ Certified copies of the priority documents have been received.

      2. ☐ Certified copies of the priority documents have been received in Application No. _____.

      3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date *8/18/2006*.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____ .

DETAILED ACTION

1.   This office action is in response to the application filed on 06/08/2006.

2.   Claims 1-28 are pending and have been examined.

Oath/Declaration

3.   The Office acknowledges receipt of a properly signed oath/declaration

filed on June 08, 2006.

Priority

4.   This application claims benefit of PCT/CN2005/001960 application filed on

11/18/2005. Therefore, the priority date considered for this application is

November 18, 2005.

Information Disclosure Statement

5.   The information disclosure statements filed 08/18/2006 has been placed in

the application file and the information referred to therein has been

considered.

Drawings

6.   The drawings filed on June 08, 2006 are accepted by the Examiner.

Examiner's Notes

7.   Examiner cites particular columns and line numbers in the references as

applied to the claims below for the convenience of the applicant. Although

the specified citations are representative of the teachings in the art and

are applied to the specific limitations within the individual claim, other

passages and figures may apply as well. It is respectfully requested that,

in preparing responses, the applicant fully consider the references in

entirely as potentially teaching all or part of the claimed invention, as well

as the context of the passage as taught by the prior art or disclosed by the

examiner.

Claim Objections

8.   Claims 3-7 are objected to because of the following informalities:

Claims 3 and 5: "the multiple predecessors" should be read as – the

multiple predecessor blocks – for the purpose of consistency.

Claim 6: "the coloring information" should be read as –the color

information – for the purpose of consistency.

Claims 4 and 7 depend on the above claims respectively. Therefore, they

are also objected for the same reason

Appropriate correction is required.

Claim Rejections - 35 USC § 112

9.   The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly
claiming the subject matter which the applicant regards as his invention.

10.   Claims 3-7, 10-14, 17-21 and 24-28 are rejected under 35 U.S.C. 112,

second paragraph, as being indefinite for failing to particularly point out

and distinctly claim the subject matter which applicant regards as the

invention.

Claim 3:

Claim 3 recites the limitation "the starting block" in lines 3 and 5. There is

insufficient antecedent basis for this limitation in the claim.

Claims 4-7:

Claims 4-7 depend on claim 3 and thus they are also rejected for the

same reason.

Claim 10:

Claim 10 recites the limitation "the starting block" in lines 4- 5. There is

insufficient antecedent basis for this limitation in the claim.

Claims 11-14:

Claims 11-14 depend on claim 10 and thus they are also rejected for the

same reason.

Claim 17:

Claim 17 recites the limitation "the starting block" in lines 4- 5. There is

insufficient antecedent basis for this limitation in the claim.

Claims 18-21:

Claims 18-21 depend on claim 17 and thus they are also rejected for the

same reason.

Claim 24:

Claim 24 recites the limitation "the starting block" in lines 4- 5. There is

insufficient antecedent basis for this limitation in the claim.

Claims 25-28:

Claims 25-28 depend on claim 24 and thus they are also rejected for the

same reason.

Claim Rejections - 35 USC § 101

11.   35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or
> composition of matter, or any new and useful improvement thereof, may obtain a patent
> therefor, subject to the conditions and requirements of this title.

12.   Claims 8-14 and 22-28 are rejected under 35 U.S.C. 101 because the

claimed invention is directed to non-statutory subject matter.

Claim 8:

Claim 8 recites a program transformer which comprises a color associator,

a compensator and a code mover (see for example, paragraph [0031],

"The main memory 30 may include...It may include a compiler or program

translator or program transformer 135 to compile, translate, or transform

the program code..."; also see paragraph [0022], "All or part of an

embodiment of the invention may be implemented by hardware, software, or firmware, or any combination thereof."). Such components are only software modules and thus can be interpreted as software program listings per se. The pieces of software are not physical "things". They are neither computer components nor statutory processes, as they are not "acts" being performed. Such claimed computer programs do not define any structural and functional interrelationships between the computer software and hardware components which permit the computer program's functionality to be realized. Therefore, computer programs (transformer) claimed as computer listings per se are nonstatutory. See M.P.E.P. 2106.01 (I)

Claims 9-14:

Claims 9-14 depend on claim 6. These claims all fail to remedy the 35 USC 101 nonstatutory problem of claim 8. Therefore, they are also rejected for the same reason.

--These rejections can be overcome by claiming the program transformer as a computer program product which stores on a non-transitory computer readable storage medium or claiming as a computer system which contains program transformer and computer hardware to execute and realize its functions.

Claim 22:

Claim 22 recite a machine-accessible medium which is defined in the specification including "any medium that can store, transmit, or transfer information...a radio frequency (RF) link...". The transmit medium (signal

or wave) is only a form of energy that is not a tangible physical article or

object and it does not fall within either of the two definitions of

manufacture. Thus, under the Interim Guidelines such media do not fall

within one of the four statutory classes of 35 U.S.C 101 Annex IV (c).

Therefore, the above claim is non-statutory. For further information, see

interim Guidelines for Examination of Patent Application for Patent Subject

Matter Eligibility (Signed 26Oct2005) –OG Cite: 1300 OG 142.

<http://www.uspto.gov/web/offices/com/sol/og/2005/week47/patgupa.htm>

Claims 23-28:

Claims 23-28 are dependent claims of claim 22. These claims all fail to

remedy the 35 U.S.C 101 nonstatutory problem of claim. Therefore, they

are also rejected for the same reason.

*--These rejections can be overcome by changing the "a machine-accessible
medium" to "a non-transitory computer-readable storage medium" which is a
tangible physical article or object and thus is* statutory.

Claim Rejections - 35 USC § 103

13.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for

all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described
as set forth in section 102 of this title, if the differences between the subject matter sought to
be patented and the prior art are such that the subject matter as a whole would have been
obvious at the time the invention was made to a person having ordinary skill in the art to which
said subject matter pertains. Patentability shall not be negatived by the manner in which the
invention was made.

14.   Claims 1-28 are rejected under 35 U.S.C. 103(a) as being unpatentable

over Chang (Change et al., IMPACT: An Architectural Framework for

Multiple-Instruction-Issue Processors") in view of Shpeisman (Shpeisman

et al., US 2005/0149916 A1) and further in view of Midkiff (Midkiff et al.,

Compiler Algorithms for synchronization)

Claim 1:

Chang discloses a code scheduling method comprising:

- Forming a program trace from blocks of instructions (basic blocks)

  which are between start and end of a critical section (superblock) (see

  for example, p.268, right column, lines 4-8, "Both prepass and

  postpass code scheduling algorithms consist of the following steps: 1)

  Form traces from basic blocks...2) Form a large superblock from each

  trace of basic blocks..."); and

- sinking (downward code motion) the instruction down the blocks

  globally to the end of the critical section using a dependence constraint

  on the instruction. (see for example, p.268, section 2.5, lines 1-13,

  "Our code scheduler moves code both upward and down ward across

  branch operations within a superblock...For downward code motion,

  e.g., X precedes Y, if Y does not depend on X then X can be moved

  below Y..."),

but Chang does not explicitly disclose associating blocks of instruction

with color information and the blocks contain a wait instruction. However,

Shpeisman in the same analogous art discloses using coloring information

(colored conflict graph)(see for example, paragraph [0034-0036]) to create a data layout by a compiler 202 to reduce or eliminate conflicts (see for example, paragraph [0034]). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the color information to sink (move) the instruction. One would have been motivated to do so to perform code scheduling without conflicts as suggested by Shpeisman (see for example, paragraph [0034]). Neither Chang nor Shpeisman discloses a wait instruction. However, Midkiff in the same analogous art discloses a wait instruction for compiling program code (see for example, p.1488, section B., Generation of wait and set instructions). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to including the wait instruction in Chang's code scheduling for code compilation. One would have been motivated to do so to synchronize between blocks of instructions (groups of statement) as suggested by Midkiff (see for example, p.1487, section C., Two Synchronization Instruction sets, lines 3-4)

Claim 2:

Chang discloses the method of claim 1 wherein associating the blocks comprises:

- identifying a sequence of the blocks corresponding to the program trace from a starting block at the start of the critical section to an

ending block at the end of the critical section, the starting block

containing the wait instruction (see for example, p.268, right column,

lines 4-9, "Form traces from basic blocks that are likely to be executed

as a sequence…Basic blocks within a superblock are placed

sequentially in memory"); and

- constructing a dependency graph for each superblock (see for

  example, (see for example, p.268, right column, lines 9-11, "3)

  Construct a dependence graph for each superblock"),

but Chang does not explicitly disclose assigning a color to the sequence of

the blocks and the wait instruction. However, as discussed above

Shpeisman in the same analogous art discloses assigning color for each

of the node in the graph. Therefore, it would have been obvious to one

having ordinary skill in the art at the time the invention was made to assign

color information to each superblock in Chang' dependency graph. One

would have been motivated to do so to perform code/instruction

scheduling including wait instruction without conflicts as suggested by

Shpeisman (see for example, paragraph [0034]).

Claim 3:

Chang discloses the method of claim 1 wherein sinking the wait instruction

comprises:

- speculatively moving the wait instruction to a basic block having

  multiple predecessor blocks, the multiple predecessor blocks including

the starting block (see for example, p.268, section 2.5, lines 1-13, "Our

code scheduler moves code both upward and down ward across

branch operations within a superblock...For downward code motion,

e.g., X precedes Y, if Y does not depend on X then X can be moved

below Y...");

- inserting compensation code to at least one of the multiple

  predecessors excluding the starting block (see for example, p.268,

  section 2.5, lines 9-13, "Note that if X is to be scheduled after Y and

  the destination register of X is in live-out(Y), a copy of X must be

  inserted between Y and its target instruction"); and

- improving the dependence graph by removing dependence and

  compute live-variable in formation (see for example, p.268, right

  column lines 10-14),

but Chang does not explicitly disclose updating the color information.

However, it would have been obvious to one having ordinary skill in the art

at the time the invention was made to update improved dependence graph

by using Shpeisman's method. One would have been motivated to do so

to perform code/instruction scheduling including wait instruction without

conflicts as suggested by Shpeisman (see for example, paragraph [0034]).

Claim 4:

Chang discloses the method of claim 3 wherein speculatively moving the

wait instruction comprises:

- moving the wait instruction to the basic block if the starting block and

  the wait instruction have same color and if the wait instruction is ready

  (see for example, p.268, section 2.5, lines 1-13, "For downward code

  motion, e.g., X precedes Y, if Y does not depend on X then X can be

  moved below Y...") .

Claim 5:

Midkiff discloses the method of claim 3 wherein inserting the

compensation code comprises:

- inserting a send signal to the at least one of the multiple predecessors

  excluding the starting block (see for example, p.1487, section V.

  Inserting synchronization instructions; also see p.1487, right column

  section 2), "The wait and set instructions: The set instruction is used to

  signal that some event has occurred...").

Claim 6:

Shpeisman discloses the method of claim 3 wherein updating the coloring

information comprises:

- resetting the color of the basic block (see for example, Fig.12, step

  1202, Coloring the conflict graph to generate a colored conflict graph

  by assigning a color to each of the plurality of node, each color

  representing a hardware resource"); and

- ▪ resetting the color of the wait instruction having an associated memory

  access instruction in the basic block (see for example, Fig.12, step

  1202, Coloring the conflict graph to generate a colored conflict graph

  by assigning a color to each of the plurality of node, each color

  representing a hardware resource").

Claim 7:

Shpeisman discloses the method of claim 6 wherein updating the color

information. Change discloses the dependence graph represent a

superblock (instructions) (see for example, p.268, right column lines 10-

12). Therefore, it would have been obvious to one having ordinary skill in

the art at the time the invention was made to understand that changing the

color of a node by using Shpeisman's method can also be used to change

the color of Change's superblock (instructions) including the wait

instruction.

Claims 8-14:

Claims 8-14 are computer program transformer component of the claimed

method, wherein all claimed limitation functions have been addressed in

claims 1-7 above respectively. It is well known in the computer art that

such method steps can be implemented as computer program transformer

and can be practiced and /or stored on a machine-accessible medium.

Thus, they also would have been obvious in view of reference teachings above.

Claims 15-21:

Claims 15-21 are system version for performing the claimed method as in claims 1-7 addressed above, wherein all claimed limitation functions have been addressed and/or set forth above and certainly a computer system would need to run and/or practice such function steps disclosed by reference above. Thus, they also would have been obvious.

Claims 22-28:

Claims 22-28 are an article of manufacture for performing the claimed method as in claims 1-7 addressed above, wherein all claimed limitation functions have been addressed and/or set forth above and certainly an article of manufacture including a machine-accessible medium would need to run and/or practice such function steps disclosed by reference above. Thus, they also would have been obvious.

Conclusion

15.   The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

16.   Any inquiry concerning this communication or earlier communications from the examiner should be directed to Zheng Wei whose telephone number is

(571) 270-1059 and Fax number is (571) 270-2059. The examiner can normally be reached on Monday-Thursday 8:00-15:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tuan Q. Dam can be reached on (571) 272-3695. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Any inquiry of a general nature of relating to the status of this application or proceeding should be directed to the TC 2100 Group receptionist whose telephone number is 571- 272-1000.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Z. W./   /Tuan Q. Dam/
Examiner, Art Unit 2192   Supervisory Patent Examiner, Art Unit 2192